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AUGUSTUS ALLEN HAYES.

AUGUSTUS ALLEN HAYES was born at Windsor, Vermont, February 28, 1806. He graduated at the Military Academy at Norwich in 1823, and began the study of chemistry as a profession under Doctor James F. Dana, then Professor of Chemistry and Mineralogy at Dartmouth College. In 1825, a laborious research undertaken by him for the purpose of accurately determining the proximate composition of various American medicinal plants was rewarded, among other results, by the discovery of the organic alkaloid sanguinaria, a compound remarkable for the brilliant color of its salts, although itself nearly colorless. In 1827 he investigated the compounds of chromium, and his paper on this subject was highly praised by Berzelius. Removing to Boston in 1828, he resided in that city or its vicinity until his death. He devoted his time to chemical investigations, and also filled successively the posts of director of an extensive manufactory of colors and chemical products at Roxbury, of consulting chemist or director of some of the most important manufacturing establishments in New England, and of State Assayer of Massachusetts. In 1837 he conducted an elaborate investigation upon the economical generation of steam and the relative value of fuels, which, in 1838, led to a novel arrangement of steam-boilers, afterwards generally adopted. Some of the results of this investigation are embodied in the "Report to the Navy Department of the United States on American Coals applicable to Steam Navigation, and to other Purposes," by the late Walter R. Johnson. To Doctor Hayes belongs also the credit of the important application of the oxides of iron in refining pig-iron in the puddling-furnace so as to produce without loss a pure malleable iron. Still earlier, the refining of copper was, under his direction, rendered a much shorter and more certain operation by the introduction of the scales of oxide of copper produced in refining. His researches on the difference in the chemical constitution and action of sea waters, on and below the surface, on soundings, and at the entrance of rivers, form part of an investigation undertaken under a commission from the United States Navy Department to examine and report on the subject of copper and copper sheathing as applied in the construction of national vessels, and his report embodies a vast amount of scientific and commercial information. In 1859–60, while considering the question of water supply for the city of Charlestown, he found, as his earlier analysis indicated, that the deep water of Mystic Pond was far less pure than the surface water. The question of diffusion under a flowing surface came up for study, with the responsibility of accepting or rejecting the source of supply. He had proved that a copper strip or wire, passing vertically through two masses of water of slightly unlike composition, would become polarized and exhibit electrolytic action. This mode of testing the exact limits of the impure water was applied under his direction, and it was shown that a compound affording sulphur, when decomposed, could be detected by its action on the strip forming a black sulphide, and the limits of the existence of this compound were read on the surface of the strip of copper, or silvered copper. Numerous observations on this and other bodies of water have proved the high practical value of the application, and demonstrated the presence of a stream of naturally pure water, nearly twenty feet deep, flowing without contamination over impure water. After the outbreak of the civil war, Doctor Hayes called public attention to the uncertainty of the foreign supply of saltpetre, and the necessity of domestic production. His efforts resulted in the manufacture of the supply for the navy from caustic potash and nitrate of soda by a novel process, the product being of great purity.

Doctor Hayes visited Europe in 1867, and after his return, at the close of the following year, was attacked by a serious illness. Recovering from the first shock, he lived nearly thirteen years, enduring continuous suffering with great patience and tranquillity. He died at his home in Longwood, June 21, 1882, at the age of seventy-six years. His wife, the daughter of the Rev. Samuel Dana of Marblehead, who had devoted herself wholly to caring for him during his long sickness, had died previously, in 1879.

The honorary degree of M. D. was conferred on Doctor Hayes in 1846 by Dartmouth College, to which institution he afterwards presented his scientific library. He was elected Fellow of this Academy, August 8, 1838, and his last scientific communication, that on the wide distribution of vanadium, was made to our body. He had the rare faculty of interesting practical men in scientific subjects, and his familiar talks at the meetings of the Thursday Evening Club were highly esteemed in Boston. His chief occupation was that of a consulting chemist, and he was for many years the chief authority in this vicinity on all the great commercial questions involving chemical principles. His opinions were highly valued, and the many industrial interests wisely fostered under his direction gave him an ample competency. He was a warm and generous friend, quick and ardent in his sympathies, full of kindness and good works. During his long illness, when, after such an active life, he was confined either to his bed or to an invalid's chair, he showed a fortitude, a resignation, and a cheerfulness which made a visit to his home an attractive pilgrimage, and these qualities, which won at the time the admiration of his friends, may be here recorded for a memorial of the nobility of his character.

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CHANDLER ROBBINS.

Chandler Robbins was born at Lynn, Massachusetts, February 14, 1810. He graduated at Harvard University in 1829, having maintained a high rank in a class of unusual ability and promise. He spent a year as a teacher in the Boston Latin School, and then entered the Cambridge Divinity School. In 1833 he became pastor of the Second Church in Boston, succeeding in that office Ralph Waldo Emerson. He resigned his pastorate in 1874, and died at Weston, Massachusetts, September 11, 1882. In his profession he was successful as a preacher; eminently assiduous, faithful, and beloved, as a pastor. His style was chaste and pure, his delivery graceful. He possessed in full measure the endowments that belong to the Christian gentleman, scholar, and minister. He had a by no means shallow vein of poetical sentiment, and contributed to the hymnology of the Church several favorite Christian lyrics. His principal extra-professional labors were in the department of history, in which he published many discourses, lectures, and articles, besides serving for many years in various offices in the Massachusetts Historical Society, and aiding in the preparation and editorship of several volumes of its collections. In 1855 he received the degree of Doctor of Divinity from Harvard University. For the latter years of his life a gradual failure of eyesight, terminating in total blindness, disabled him for active duty, and at the same time brought into conspicuous exercise those passive virtues which grow only from profound religious faith, trust, and experience.